PETROV, P.N., inzh.; RABINOVICH, V.D., kand.tekhn.nauk; KHINSKIY, P.D., kand.tekhn.nauk

Effect of nonmetallic inclusions on the strength of turbine disks. Energomashinostroenie 7 no.11:27-30 N '61. (MIRA 14:11)
(Disks, Rotating—Testing)

KLEISKIN, G.I., kand. tekhn. nauk; SUKHARCHUK, Yu.S., kand. tekhn. nauk; BLAGOVESHCHENSKOV, B.P., inzh.; SOBOL', N.L., inzh.; D'YAKONOV, V.Ye., inzh.; RABINOVICH, V.D., inzh.

Melting cast iron in a coke-oven gas-fired cupola. Lit.proizv. no.12:1-4 D '65. (MIRA 18:12)

RABINOVICH, V.I., kand. iskusstvovedeniya

Objective tendencies ir the developments of the architecture of the capitalist countries. Izv. ASiA no.4:75-84 '61. (MIRA 16:11)

KARANDEYEV, K.B.; RABINOVICH, V.I.; TSAPENKO, M.P.

Definition of the concept "mensuration." Izm.tekh. no.12:4-6 D '61. (MIRA 15:1)

(Mensuration)

S/115/63/000/004/002/011
E140/E135

AUTHORS: Rabinovich V.I., and Tsapenko M.P.

TITLE: On the quantity of measurement information

PERIODICAL: Izmeritel'naya tekhnika, no.4, 1963, 7-10

TEXT: The article is based on a communication presented at the Vsesoyuznaya konferentsiya po avtomaticheskomu kontrolyu i metodam elektricheskikh izmereniy (All-Union Conference on Automatic Control and Electrical Measurement Methods) held in Novosibirsk, September 1962. It describes a procedure for determining the quantity of information obtained in a measurement process, under the following assumptions: 1) since the measured quantity and the error of intermediate steps in its conversion take on a priori unknown values, they are to be considered random stationary variables; 2) the measurements are assumed to be statistically independent; 3) the conversion errors are assumed independent of the values of the measured quantity, and additive with respect to the latter; 4) the errors of sampling and the insensitive zone (threshold) of the quantisation apparatus are assumed negligibly small. Then the quantity of information

Card 1/2

constitutes a measure of the degree to which successive values of the measured process are dependent. The quantity of information is zero if there is no dependence between successive values (zero autocorrelation), and maximum if there is a unique functional dependence relating any two values. Shannon's theory is applied to obtain suitable formulas for this statement of the problem. There are 3 figures.

Card 2/2

L 19604-63 EWT(d)/FCC(w)/BDS AFFTC/IJP(C)

ACCESSION NR: AP3003200 S/0115/63/000/006/0001/0005

AUTHOR: Rabinovich, V. I.; Tsapenko, M. P.

TITLE: Quantity of information with a uniform distribution of measurand and error

SOURCE: Izmeritel'naya tekhnika, no. 6, 1963, 1-5

TOPIC TAGS: information, information quantity, measurand, error

ABSTRACT: A further development in the theory of these authors (see Izmeritel'naya tekhnika, 1963, no. 4) is reported. The process of measurement can be characterized by the quantity of information, provided the probability distribution of measurand is known. The quality of measuring instruments is evaluated on the assumption that the measurand probability distribution is uniform; also, the distribution of error of the intermediate transformations is assumed to be uniform. These formulas are developed for evaluating the

Card 1/02

quantity of measurement information:

$$\underline{I}(x/z)=\ln\frac{L}{\Delta}-\overline{H}_{\Delta}(x/z)=\ln N_{\Delta}-\overline{H}_{\Delta}(x/z) \quad (10)$$

$$\text{or} \quad \underline{I}(x/z)=\ln\frac{L}{\gamma}-\ln\frac{\Delta}{\gamma}-\overline{H}_{\Delta}(x/z)=$$

$$=\ln N_{\gamma}-[\overline{H}_{\Delta}(x/z)+\ln n]=\ln N_{\gamma}-\overline{H}_{\gamma}(x/z) \quad (11)$$

where L is the range of variation of the measurand x; γ is the range of variation of the error y; other symbols are explained in the reference article. Authors' conclusions: Assumption of the uniformly distributed error results, other things being equal, in the minimum quantity of measurement information; meanwhile, the formulas for the quantity of information are simple; hence, the method given in the article can be used for comparing instruments and also, in some cases, for characterizing the quality of measuring processes (e.g., in designing multimeters). Orig. art. has: 3 figures, 14 formulas, and 2 tables.

RABINOVICH, V.I.; TSAPENKO, M.P.

Information content for the case of an even distribution of the measured magnitude and a normal distribution of the error. (MIRA 16:12)
Izm. tekh. no.10:8-13 O '63.

RABINOVICH, V.I.

Fifth All-Union Conference on Electric Methods of Automatic Control. Izv. SO AN SSSR no.2. Ser. tekh. nauk no.1:141 '64. (MIRA 17:8)

PEREPELKIN, K.Ye.; RABINOVICH, V.I.

Dry method of forming fibers from polyvinyl alcohol. Khim. volok. no.3:11-15 '64. (MIRA 17:8)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

RABINOVICH, V.I.

Morphology of polyvinyl alcohol fibers formed by the "dry" method. Khim. volok. no.4:12-15 '65. (MIRA 18:8)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

RAFIYENKO, D.I., kand.tekhn.nauk; RABINOVICH, V.I.

Improving the equipment and technology of recovery of ores during the mining of lode deposits. Gor. zhur. no.12:12-14 D '63. (MIRA 17:3)

RAFIYENKO, D.I., kand.tekhn.na k; RABINOVICH, V.I.

Improving the equipment and technology of recovery of ores during the mining of lode deposits. Gor.zhur. no.12:12-14 D '63. (MIRA 17:3)

KOROBOV, P.I.; KHLEBNIKOV, V.B.; BORISOV, A.F.; SKOCHINSKIY, A.A.; SHEVYAKOV, L.D.; MEL'NIKOV, N.V.; MALESHKIN, S.M.; MOSKAL'KOV, Ye.F.; POKROVSKIY, M.A.; KAPLUNOV, R.P.; BOGOLYUBOV, B.P.; ARUTYUNOV, N.B.; BOYKO, V.Ye.; BRINZA, N.N.; FEDOROV, V.F.; AGOSHKOV, M.I.; NARODNIKOV, A.V.; VORONIN, L.N.; IPATOV, P.M.; NAZAROV, P.P.; SLUTSKAYA, O.N.; CHERNENKO, N.B.; RABINOVICH, V.I.; SAVITSKIY, V.N.; TROITSKIY, A.V.; GOL'DIN, Ya.A.; DZHAPARIDZE, Ye.A.; ZHURAVLEV, S.P.; KUZNETSOV, K.K.; MALEVICH, N.A.; MARTINENKO, M.P.; MARTYNOV, G.P.; NATAROV, P.F.; PERTSEV, M.A.; ROSSMIT, A.F.; SHASHOV, A.A.; SOSEDOV, O.O.; VINOGRADOV, V.S.; ZUBAREV, S.N.; SHAFARENKO, I.P.

Nikolai Nikolaevich Patrikeev; an obituary. Gor.zhur. no.6:76 Je '60. (MIRA 14:2)

(Patrikeev, Nikolai Nikolaevich, 1890-1960)

RABINOVICH, V. I.

AID P - 5262

Subject : USSR/Engineering

Card 1/1 Pub. 11 - 13/15

Author : Rabinovich, V. I. (Barnaul Boiler Plant)

Title : Resistance slag welding of tubing plates for pressure vessels.

Periodical : Avtom. svar., 4, 120-123, Ap 1956

Abstract : The Barnaul Boiler Plant has developed the method and equipment for resistance slag welding of discoidal plates some 70 to 80mm thick, up to 2,400mm in diameter, made of killed steel of the St.3 and St.4-type, for pressure vessels. The author describes concisely the procedure, and equipment. Two tables, 1 photo and 1 drawing.

Institution : As above

Submitted : No date

AID P - 5403

Subject : USSR/Engineering

Card 1/1 Pub. 107a - 5/12

Author : Rabinovich, V. I., Eng.

Title : Submerged arc welding in making boiler drums

Periodical : Svar. proizv., 10, 17-20, 0 1956

Abstract : The new procedure in welding thick, high pressure wessels developed at the Barnaul Boiler Plant is described by the author. He tells about the technique and equipment used for submerged arc welding of boiler drums up to 7m long and 50 to 90mm thick of the 20K and 22K type steels. The A-372-P welding machine, the Sv-10G2 electrode wire and the AN-8 flux (its elements are given) are mentioned. Three tables, 6 drawings, 6 photos; 2 GOST standards.

Institutions: Electrowelding Institute im. Paton and the Leningrad Branch of the All-Union Design and Planning Technological Institute (LF VPTI).

Submitted : No date

SOV/137-59-3-5862

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 131 (USSR)

AUTHOR: Rabinovich, V. I.

TITLE: Coated-electrode Slag-welding of Thick-walled Vessels (Elektroshlakovaya svarka tolstostennykh sosudov)

PERIODICAL: Prom. Altay (Sovnarkhoz Altayskogo ekon. adm. r-na), 1958, Nr 2, pp 23-32

ABSTRACT: The coated-electrode slag-welding method is employed at the Barnaul boiler plant (BKZ) in the manufacture of boiler shells, bottom plates, and high-pressure (up to 320-at) gas cylinders, made of steels 20K and 22K, having a wall thickness of 50-200 mm with seams ranging up to 7.1 m in length. Welding (W) of longitudinal seams is performed by the submerged-arc system employing two electrodes, an AN-8M flux, and welding wire of the Sv10G2 type; the seam is filled in in a vertical position. The welding device, which is equipped with a rack-and-pinion apparatus of the A-372r type and a forced cooling system for the copper sliders, is capable of performing W of two seams simultaneously. In W of metal plates 110-155 mm thick, a special attachment ensuring rigidity of the shell is employed in conjunction

Card 1/3

Coated-electrode Slag-welding of Thick-walled Vessels

with mouthpieces designed for long wear (the machine time involved in W frequently amounts to 8 hours). Girth W of vessels 900-2000 mm in diameter having a wall thickness of 50-200 mm is performed on a special device utilizing a modified A-385 unit. The W of girth seams is started with only one electrode in a special guiding recess within the inner cooled backing ring. A potential of 40-42 v is employed, the rate of feed of the welding wire amounting to 100 m/hr. After the stabilization of the coated-electrode slag-welding process, the potential is increased to 50 v, while the rate of feed of the welding wire rises to 250 m/sec. The second electrode is connected into the circuit when the depth of the molten metal becomes equal to the cross-sectional thickness of the metal being welded. The design for a sectional slider was developed. Stress relief and recrystallization of the weld metal is accomplished by normalizing of the cylinders at a temperature of 930°C (rate of heating $\leq$ 200 deg/hr; soaking time at that temperature is determined on the basis of one minute for each mm of wall thickness). The formation of scale during heating is prevented by burning of charcoal within the cylinder. A reducing atmosphere with an excess pressure of up to 2.5-3.0 at is established. The cylinders are cooled in still air from a temperature of 400°. Whereas cylinders made of steel 22K having a wall thickness of 90-110 mm are subjected to normalization only, cylinders with a wall thickness of 155 mm are also tempered in order to relieve stresses produced by any nonuniform cooling in

Coated-electrode Slag-welding of Thick-walled Vessels

the process of their normalization. Employment of the coated-electrode slag-W increased the efficiency of hard-facing operations to 25-35 g/a·hr, and reduced the consumption of flux and electrical energy by a factor of 20-30 and 1.5-2.0, respectively; the time required for the manufacture of boiler shells and cylinders was reduced by 50%. The area required for the manufacturing operations was also reduced. As a result, 14 million rubles were saved in 1956.

N. T.

AUTHOR: Rabinovich, V.I. SOV/125-58-11-14/16

TITLE: Electric-Slag Welding Process with Beveling of Edges (Elektro-shlakovaya svarka s razdelkoy kromok)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 11, pp 85-89 (USSR)

ABSTRACT: As a result of tests, information is given on the possibility to obtain good-quality weld joints by electric slag welding with cup-shaped beveling of edges and incomplete penetration. The described method can be used in the production of complicated structures. The production of a hydraulic press die by the new method is described in detail.
There are 2 diagrams, 2 sets of microphotos, 1 photo, 2 tables and 2 Soviet references.

ASSOCIATION: Barnaul'skiy kotel'nyy zavod (Barnaul Boiler Plant)

SUBMITTED: July 26, 1958

Card 1/1

RABINOVICH, V. I.

25(1) PHASE I BOOK EXPLOITATION SOV/3421

Akademiya nauk URSR, Kiyev, Institut elektrosvarki imeni akademika Ye.O. Patona

Vnedreniye novykh sposobov svarki v promyshlennost', vyp. 2 (Introduction of New Welding Methods in Industry; Collection of Articles, No. 2) Kiyev, Gos. izd-vo tekhn. lit-ry Ukrainskoy SSR, 1959. 194 p. Errata slip inserted. 3,000 copies printed.

Ed.: V. Garmasha; Tech. Ed.: S. Matusevich.

PURPOSE: This book is intended for workers in the welding industry.

COVERAGE: The book contains a discussion of welding techniques and problems by groups of scientists and welders. Much attention is given to problems in the application of new methods of mechanized welding and electro-slag welding. This is the second collection of articles under the same title prepared and published by the Institut elektrosvarki imeni Ye.O. Patona (Institute of Electric Welding imeni Ye.O. Paton). The preface is written by B.Ye. Paton, Academician of the Ukrainian Academy of Sciences and Winner of the Lenin Prize. There are no references.

Iskra, A. S. [Engineer], Yu. A. Sterenbogen [Candidate of Technical Sciences], V. M. Khrundzhe [Engineer; Institut elektrosvarki imeni Ye.O. Patona (Electric Welding Institute imeni Ye.O. Paton)], D. P. Antonets [Engineer, Zhdanovskiy zavod imeni Il'icha (Plant imeni Il'ich in Zhdanov)], V. I. Rabinovich [Engineer; Barnaul'skiy kotel'nyy zavod (Barnaul Boiler Plant)], and V. V. Chernykh [Engineer; Novo-Kramatorskiy mashinostroitel'nyy zavod (New Kramatorsk Machinery Plant)]. Electro-slag Welding of Steel-plate Constructions 17

Iskra, A. S. [Senior Engineer], A. M. Makara [Candidate of Technical Sciences], and L. V. Novikov [Senior Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)]. Making Bodies for Chemical Equipment by Electro-slag Welding of Medium-alloyed Steel Forgings 32

Medovar, B. I. [Candidate of Technical Sciences], A. N. Safonnikov [Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], and I. N. Gerasimenko [Head of Welding Department; Podol'skiy mashinostroitel'nyy zavod imeni S. O. Ordzhonikidze (Podol'sk Machinery Plant imeni S. O. Ordzhonikidze)]. Electro-slag Welding of Large Flanges of 1Kh18N9T Austenitic Steel 51

Gurevich, S. M. [Candidate of Technical Sciences], V. P. Didkovskiy [Engineer; V. D. Zagrebenyuk [Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], P. S. Sinegol'skiy [Head of Welding Office], and V. P. Shavyrev [Technologist of a welding shop]. Electro-slag Automatic Arc Welding of Medium and Large Thickness of Titanium 64

Pokhodnya, I. K. [Candidate of Technical Sciences], V. P. Subbotovskiy [Senior Engineer], I. I. Frumin [Candidate of Technical Sciences; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], L. A. Volkova [Shop Foreman; Dnepropetrovskiy metallurgicheskiy zavod imeni G. I. Petrovskogo (Dnepropetrovsk Metallurgical Plant imeni G. I. Petrovskiy)], V. P. Gorelov [Shop Superintendent; Alchevskiy metallurgicheskiy zavod imeni K. Ye. Voroshilova (Alchevsk Metallurgical Plant imeni K. Ye. Voroshilov)], and N. A. Ryabenko [Chief Mechanic, Magnitogorskiy metallurgicheskiy kombinat (Magnitogorsk Metallurgical Combine)]. Introduction of Automatic Hard-surfacing in the Metallurgical Industry 74

Lashkevich, N. I., [Candidate of Technical Sciences], S. L. Mandel'berg [Candidate of Technical Sciences; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institut imeni Ye. O. Paton)] Z. O. Kavyshinskiy [Candidate of Technical Sciences; Ukrainskiy nauchno-issledovatel'skiy trubnyy institut (Ukrainian Scientific and Research Institute of Pipes)], and S. A. Frikke [Chief Engineer; Chelyabinskiy trubo-prokatnyy zavod (Chelyabinsk Pipe-rolling Plant)]. New Technique in Straight-seam Welding of Large-diameter Oil and Gas Pipes 95

Gorbunov, G. V. [Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)]. P. A. Zasko, [Chief Engineer; Svarochno-montazhnyy trest (Welding and Assembling Trust)], and A. N. Yuryshev [Chief of the Department of Gas Pipeline Construction; Glavgaz SSSR (Main Administration of the Gas Industry of the USSR)]. Mechanized Methods of Welding in Pipeline Construction 108

Mayevskiy, G. Y. [Candidate of Technical Sciences, Winner of Lenin Prize; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], V. Ya. Mayevskiy [Chief Engineer; Ukrglavneftesbyt (Ukrainian Main Administration for Petroleum Marketing)], and Ye. P. Martinson [Head of Construction and Assembly Administration No. 70; Trest 7, Ministerstvo stroitel'stva RSFSR (RSFSR Ministry of Construction, Trust 7)]. Introduction of the Method for Weldments in the Petroleum Industry 110

34

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0013438

RABINOVICH, V I.

18(2,3,5) SOV/125-59-9-9-/16

AUTHOR: Gupalo, Yu. D., Candidate of Technical Sciences, Rabinovich, V.I., Bel'for, M.G., Rozenberg, O.O., and Khrundzhe, V.M., Engineers

TITLE: Electric Welding under Slag of Circumferential Welds of Thickwalled Tanks

PERIODICAL: Avtomaticheskaya svarka, 1959, Nr 9, pp 64-73 (USSR)

ABSTRACT: The Barnaul'skiy Boiler-Works in co-operation with the Institute of Electric Welding imeni Ye.O. Paton has, in 1953-1958. worked out and introduced the method of electric welding of longitudinal and circumferential welds for boilers and hydraulic press drums, made of steel 22 k and having a wall thickness of 4 to 20 cm. In Fig 1, a cylindrical tank of 1000-2000 liters capacity with walls 10-15 cm thick, working under pressure of 320 atm. is given. Before the new process was introduced, such tanks were made of forged sheets, or they were all-forged; as a result of this method of manufac-

Card 1/3

Electric Welding under Slag of Circumferential Welds of Thickwalled Tanks

turing, the total losses of metal wasted in machining and forging amounted to 73%, while the process of machining and finishing took 2 to 3 weeks. The new method enables manufacturing of cylindrical tanks out of two parts prepared by hot stamping under pressure of 8000 tons. Welding of circumferential joints is performed by two electrodes at the electrode feed speed of 100 m/hour. At the beginning of the process, the tension of the arcs applied is 40 to 42 volts; later on, when the process becomes stabilized, the tension is raised up to 45 volts, and the electrode feed speed up to 250 m/hour. The slag puddle is 45-55 mm deep. In Table 1, figures showing the conditions of welding are given. In compliance with the regulations of the Gosgortekhnadzor and of the technical conditions of BKZ, the quality of welds undergoes a control which is performed by means of ultra-sonic defectoscopes that permit disclosing of such faults which could not be detected

Electric Welding under Slag of Circumferential Welds of Thickwalled Tanks

by using other methods of checking, and which shorten the process of γ -rays examination. The examination is, as a rule, performed on 25% of circumferential welds 15 cm thick is 90 minutes. Table 2 gives the average figures on testing of welds having δ = 155 mm. Welding was performed by S_v -10G2 electrode wire with application of powder flux AN-8M. There are 2 tables, 6 diagrams, 1 photograph and 7 Soviet references.

ASSOCIATION: 1) Barnaul'skiy kotel'nyy zavod (Barnaul Boiler Works); (Rabinovich) 2) Ordena trudovogo krasnogo znameni institut elektrosvarki imeni Ye.O.Patona AN USSR (Order of the Red Banner of Labor Institute of Electric Welding imeni Ye.O.Paton, AS UkrSSR), (Bel'for, Gupalo, Rozenberg, Khrundzhe)

SUBMITTED: August 21, 1958

KABINA-VICH, V. I.

PHASE I BOOK EXPLOITATION SOV/5078

Akademiya nauk URSR, Kiyev. Instytut elektrozvarzuvannya

Vnedreniye novykh sposobov svarki v proyzvodstvennost'; sbornik statey. Vyp. 3. (Introduction of New Welding Methods in Industry; Collection of Articles. v. 3) Kiyev, Gos. izd-vo tekhn. lit-ry URSR, 1960. 207 p. 5,000 copies printed.

Sponsoring Agency: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki imeni akademika Ye. O. Patona Akademii nauk Ukrainskoy SSR.

Ed.: N. Pisarenko; Tech. Ed.: S. Matusevich.

PURPOSE: This collection of articles is intended for personnel in the welding industry.

COVERAGE: The articles deal with the combined experiences of the Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton) and several industrial enterprises in solving scientific and engineering problems in welding technology. Problems in the application of new methods of mechanized welding and electroslag welding in industry are discussed. This is the third collection of articles published under the same title. The Foreword was written by B. Ye. Paton, Academician of the Academy of Sciences Ukrainian SSR and Lenin prize winner. There are no references.

TABLE OF CONTENTS:

S/125/60/000/012/009/014
A161/A030

AUTHORS: Rabinovich, V.I.; Kilevich, F.V.

TITLE: Welding Metal Structures with CO_2 Shielding

PERIODICAL: Avtomaticheskaya svarka, 1960, No. 12, pp. 66 - 70

TEXT: Semi-automatic and automatic welding with CO_2 for shielding is used at the Barnaul Boiler Plant. The equipment and the techniques are described. The semi-automatic "A-537" welder of the Elektric Welding Institute imeni Ye.O. Paton is used with a ЗП-7.5/30 (ZP-7.5/30) generator with self-excitation; the generator with the control system are placed in one closet; the feed mechanism and the holder with welding wire coil are mounted on a mobile carriage. (No illustrations and no further details are given). The Barnaul plant has developed holders of its own design for the "A-537" welder (Fig. 1) that are simple to make, enable access to difficult spots, and have little weight - 750 g and 800 g. The heavier model is water cooled. An acetylene pressure meter is used as flow meter. Low-carbon steel is welded with food industry grade CO_2 per GOST 8050-56 standard, and Св-10ГС (Sv-10GS) 2 mm wire per GOST 2246-54 (0.11% C, 0.9% Mn, and 0.7% Si). Wire is cleaned by heating to 250 - 300°C during 0.5 - 1.0 hr; in the welding process it

Card 1/6

Welding Metal Structures with CO_2 Shielding

is passed through a row of rubber washers in front of the wire feed mechanism. The washers are periodically replaced. The semi-automatic process is used for butt and angle welds, with inverse polarity, by narrow beads with rapid holder motion, producing a bead with 3 - 10 mm leg. 6 mm-leg welds are made with cross oscillation of the electrode. Slow motion of the holder is not recommended because of increased spatter and spoiled welds. A welding pool wider than 10 mm and longer than 20 mm at less than 20 m/hr welding speed impairs the gas shielding and results in pores and holes in weld metal. To avoid this the nozzle outlet diameter and the gas feed must be increased, as well as the welding speed. The process details for butt and angle welds are given (Table 2):

Joint	Metal depth, mm	Passes	I, amp	U, volts	V m/hr	Electrode throat mm	Gas feed liter/min	Electrode incline o
Angle	3	1	210-250	27-29	30-40	20-25	8-10	45
	5	1	210-250	28-30	30-40	20-25	8-10	45
	8	1-2	210-250	29-31	25-35	20-25	8-10	45
	10	2	210-250	31-33	20-30	20-25	10-12	45

Card 2/6

Welding Metal Structures with CO_2 Shielding

Table 2 continued:

Butt	3	1	210-250	28-29	35-45	20-22	10-12	25-35
	5	1	210-250	28-30	30-40	20-22	10-12	25-35
	8	2	210-250	29-31	25-35	20-22	10-14	25-35
	10	2	210-250	31-33	25-30	20-22	12-15	25-35

The semi-automatic process has raised the work productivity in welding brackets, supports, ladders and other details of boiler frames 1 1/2 times. An automatic apparatus (Fig. 2) is used for welding lids to pipes (developed at the Barnaul plant) (Fig. 3). It consists of a welding head made of ar. АДШМ -500 (ADShM-500) feed mechanism, controls, a rotator, a bobbin for wire, and a ZP-7.5/30 self--excitation generator. Welding is done with inclined electrode from the top, with D.C. on inverse polarity. The welds quality is much better than in manual welding the work productivity 5 times higher. Another welding automation with program--cam control is mentioned (without description), developed at the plant's welding bureau for joining one workpiece only with three circular welds and one inclined weld - spark extinguisher for tractor engines (Fig. 4). It can also be used for

Card 3/6

Welding Metal Structures with CO_2 Shielding

other work with the same length and welds. [Abstracter's note: No legend to Fig. 1 is included]. Editor's note: Sv-10GS welding wire does in the most part of possible cases not guarantee sound welds and is therefore not recommended. Co-08T 2C (Sv-08G2S) per GOST 2246-60 ought to be used.

ASSOCIATION: Barnaul'skiy kotel'nyy zavod (Barnaul Boiler Plant)

SUBMITTED: May 16, 1960

Card 4/ 6

S/125/60/000/012/009/014
A161/A030

Welding Metal Structures with CO_2 Shielding

Figure 1:

Holders for semi-automatic welding
a - without water cooling
b - with water cooling

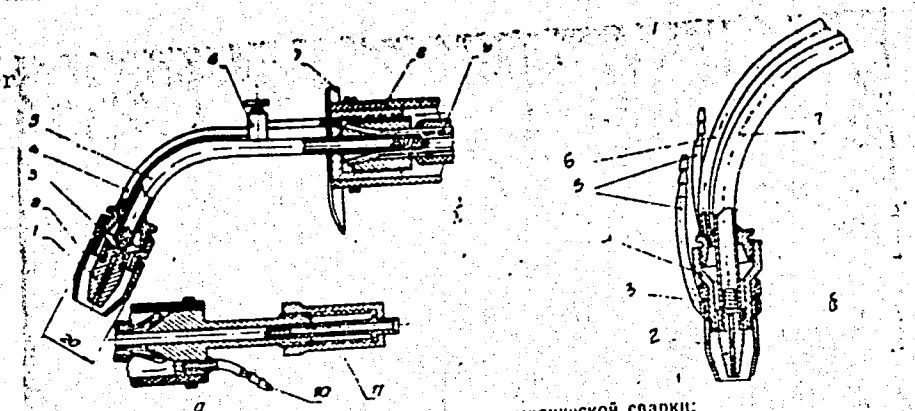


Рис. 1. Держатели для полуавтоматической сварки:
а — без водяного охлаждения; б — с водяным охлаждением.

Card 5/6

S/125/60/000/012/009/014
A161/A030

Welding Metal Structures with CO_2 Shielding

Figure 2:

Installation for the automatic welding-on of blind flanges to connecting pipes.

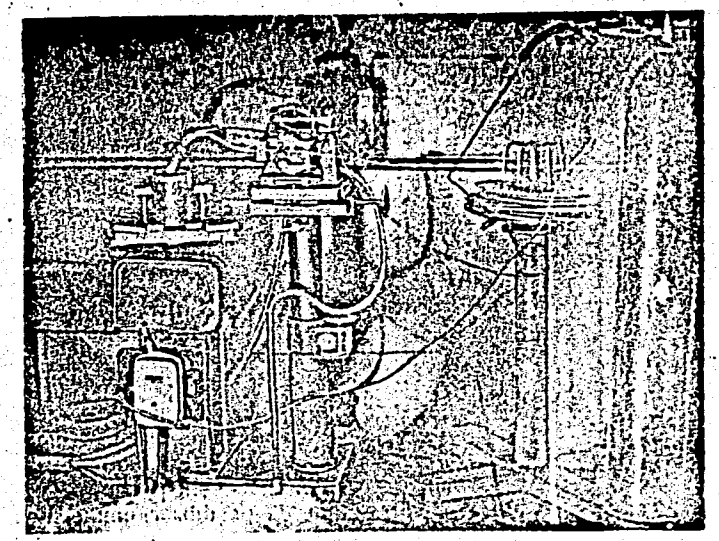


Рис. 2. Установка для автоматической приварки заглушек к штуцерам.

Card 6/6

22235
S/125/61/000/001/004/016
A161/A133

1.2300 also 1513

AUTHOR: Rabinovich, V.I.

TITLE: Electro-slag welding of 1Х18Н9Т (1Kh18N9T) steel with wire electrode

PERIODICAL: Avtomaticheskaya svarka, no. 1, 1961, 27-33

TEXT: The Barnaulskiy kotel'nyy zavod (Barnaul Boiler Plant) produces chemical equipment from 1Х18Н9Т (1Kh18N9T) steel for service under high pressure (25 atm) in corrosive oxidizing media. Electro-slag welding tests have been carried out with 65 mm thick specimens of this steel and a piping system made of it and pipes from 1Х18Н12Т (1Kh18N12T) steel, with different welding wires and flux grades. The chemical composition of the 1Kh18N9T steel delivered from the Kuznetskiy metallurgicheskiy kombinat (Kuznetsk Metallurgical Combine) is given in comparison with the standard ГОСТ 2632-51 (GOST 2632-51) specification (Table 1):

Card 1/6

Electro-slag welding of 1Х18Н9Т (1Kh18N9T) steel...A161/A133

	C	Mn	Si	Cr	Ni	Ti	S	P
GOST 2632-51	0.2	2.0	0.8	17-20	8-11	To 0.8	0.03	0.035
In the KMK certificate	0.10	1.23	0.64	17.62	10.0	0.46	0.012	0.023

The fluxes АН-8 (AN-8), АН-26 (AN-26), АНФ-6 (ANF-6) and 48-ОФ-6 (48-OF-6) were melted in an electric arc furnace with water cooled steel crucible. The welding process data are: wire diameter 3 mm; gap width 27^{+2}_{-1} mm; wire feed 250-325 m/hour; alternating current of 550-600 amp, 40-43 v; mean welding speed 1.5-2.0 m/hour; slag bath depth 50-55 mm; dry electrode neck 40 mm; transverse electrode displacement 57.6 m/hour; the electrode stopped 10 mm before the slider for 5 sec. The information includes the composition (in %) of wires (Table 2) and fluxes (Table 3):

Card 2/6

Electro-slag welding of 1Kh18N9T(1Kh18N9T) steel ... A161/A133

Table 2:

Wire	C	Mn	Si	Cr	Ni	Ti	Mo	S	P
Sv-1Kh18N9T: Analysis	0.09	1.45	0.69	19.17	9.97	0.60		0.025	0.019
GOST 2246-54	0.1	1-2	0.30-0.70	18-20	8-10	0.5-0.8		0.02	0.03
Sv-0Kh18N9: Analysis	0.07	1.44	0.79	18.94	9.98	-	-	0.012	0.026
GOST 2246-54	0.06	1-2	0.5-1.0	18-20	8-10	-	-	0.02	0.02
Sv-1Kh18N11M: Analysis	0.06	1.44	0.38	16.78	11.00	-	2.57	0.017	0.021
GOST 2246-54	0.06	1-2	0.3-0.7	18-20	10-12	-	2-3	0.02	0.03

Card 3/6

Electro-slag welding of 1X18H9T (1Kh18N9T) steel ...

Table 3:

Flux	SiO_2	MnO	CaF_2	MgO	Al_2O_2	CaO	FeO	Fe_2O_3	S	P
ANF-6	-	-	65	-	35	-	-	-		
48-OF-6	4.0	0.3	45-60	3	20-27	16-23	-	1.5	0.05	0.04
AN-26	30-32	2.5-3.5	20-24	16-18	20-22	5-6.5	1.0	-	0.7	0.10
AN-8	33-36	21-26	13-19	5-7	11-15	4-7	to 1.5	-	to 0.15	to 0.15

The weld metal macrostructure was investigated in the natural state after welding and after austenization at 1,100°C with cooling in air and water. Hot pickling for one hour was effected, in a boiling Keshian solution (500 milliliter HCl, 70 milliliter H_2SO_4, 80 milliliter H_2O), with subsequent washing in a soda solution and water. Three zones were established: 1) columnal crystals stretching along the joint axis, 2) columnar weld metal crystals, 3) overheated base metal. The overheating zone was not revealed after water quenching or air cooling, but the weld metal did not change. The welds were

Card 4/6

completely sound. Hot cracks were absent, in all combinations of wires and fluxes. Photographs of metal structure are presented. The test results of intercrystalline corrosion demonstrated that the recommendations concerning the addition of aluminum powder or Ti-Al alloy into the 48-OF-6 flux (Ref.4, I.D. Davydenko, V.F. Koshevoy, A.N. Nosenko, Electro-slag welding of 1Kh18N9T plate steel, "Svarochnoye proizvodstvo", No.3, 1960) are not justified.

Conclusions: 1) Joints welded by any of the tested three wire grades in combination with nonoxidizing fluxes with $CaF_2+Al_2O_3$ and CaF_2+CaO base are resistant to intercrystalline corrosion, not only after quenching but also without heat treatment. 2) The tendency to hot cracks in welds in 1Kh18N9T is comparatively low. Therefore, the chromium/nickel content ratio in weld metal may be about 1.6-1.9 (instead of 2.2-2.3 used in the submerged arc process). 3) The mechanical properties of joints and weld metal are very high and equal to the properties in 1Kh18N9T base metal. Quenching in air and water increases the ductility and impact resistance weld metal. 4) Electro-slag welding technology for 1Kh18N9T plate steel was recommended and applied in the production of chemical equipment - with the use of Sv-0Kh18N9, Sv-1Kh18N9T and Sv-Kh18N11M wire grades in combination with ANF-6 and 48-OF-6 fluxes. Candidate of Technical Sciences B.I. Medovar supervised the experi-

Electro-slag welding of 1X18H9T (1Kh18N9T) steel...

ments; Engineer D.I. Yaroslavskiy and Technician L.I. Sokolov participated. There are 4 figures and 6 Soviet-bloc references.

ASSOCIATION: Barnaul'skiy kotel'nyy zavod (Barnaul Boiler Plant)

SUBMITTED: June 23, 1960

RABINOVICH, V.I.; MARCHENKO, A.L.

Advisability of forge rolling of joints between thin-walled tubes and thick sheets. Avtom. svar. 15 no.3:64-67 Mr '62. (MIRA 15:2)

1. Barnaul'skiy kotel'nyy zavod.
(Tubes--Welding)
(Boilers, Water-tube--Welding)

ACCESSION NR: AP4043205 S/0125/64/000/008/0050/0053

AUTHORS: Medovar, B. I.; Rabinovich, V. I.

TITLE: Electro-slag remelting of boiler manganese steel 09G2S

SOURCE: Avtomaticheskaya svarka, no. 8, 1964, 50-53

TOPIC TAGS: boiler steel deficiency, steel friability, sulfur, oxygen, nitrogen, steel heat resistance, impact strength, welding, steel aging, steel tempering, normalizing, electro slag remelting, manganese steel, boiler steel, instrument steel, steel

ABSTRACT: While steel 09G2S has desirable properties for use in boilers and instruments, insufficiencies (pores, accumulation of non-metallic enclosures) appeared in the thick-rolled form, lowering the quality of welded units and boilers. Tests for the electro-slag treatment were conducted with 100 mm thick steel sheets used for electrodes; these were remelted into ingots with flux, then forged to a slab on which tests for its chemical composition and mechanical strength were conducted. The results are tabulated. Electroslag remelting decreased the contents of sulfur, oxygen, nitrogen and non-metallic enclosures by about ½; the steel becomes

Card 1/2

ACCESSION NR: AP4043205

less sensitive to overheating (tests at 350C). Impact strength remained practically the same, in the sheet and in welded seams, even after aging. The required mechanical properties of assemblies executed with electroslag weld could frequently be obtained without normalizing. The only requirement was high temperature tempering to releave strains. The first pilot plant product confirms the laboratory experience. Orig. art. has: 6 tables

ASSOCIATION: Institut elektrosvarki im. E. O. Patona AN UkrSSR (Institute of Electrowelding, AN UkrSSR)

SUBMITTED: 26Oct63 ENCL: 00

SUB CODE: MM NR REF SOV: 005 OTHER: 000

Card 2/2

KARANDEYEV, Konstantin Borisovich; KARPYUK, Bogdan Vladimirovich; KASPEROVICH, Aleksandr Nikolayevich; PUSHNOY, Boris Mikhaylovich; RABINOVICH, Vladimir Izrailevich; SINITSYN, Boris Sergeyevich; TVERDOKHLEB, Petr Yemel'yanovich; TSAPENKO, Mikhail Petrovich; Prinimali [illegible]: [illegible]OV, V.M., nauchn. sotr.; MATUSHKIN, G.G., nauchn. sotr.

[Electrical methods in automatic control] Elektricheskie metody avtomaticheskogo kontrolia. Moskva, Energiia, 1965. 383 p. (MIRA 18:8)

RABINOVICH, V.I. (Novosibirsk); ROZOV, M.A. (Novosibirsk); TIMONEN, L.S. (Novosibirsk)

Problems and objectives of technical diagnosis. Avtometriia no.1: 27-34 '65. (MIRA 18:7)

RABINOVICH, V.I.

Selecting values of the standard magnitude. Izm. tekh. no.2: 8-11 F '65. (MIRA 18:6)

RABINOVICH, V.I.; PEREPELKIN, K.Ye.

Effect of the magnitude of spin-stretching on the physicomechanical properties of "vinol" fibers. Khim. volok. no.2:18-22 '65.
(MIRA 18:6)

1. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.

ACC NR: AM6004772 Monograph

Karandeyev, Konstantin Borisovich; Karpyuk, Bogdan Vladimirovich; Kasperovich, Aleksandr Nikolayevich; Pushnoy, Boris Mikhaylovich; Rabinovich Vladimir Izrailevich; Sinitsyn, Boris Sergeyevich; Tverdokhleb, Petr YEmel'yanovich; TSapenko, Mikhail Petrovich

Electrical methods of automatic control (Elektricheskiye metody avtomaticheskogo kontrolya) Moscow, Izd-vo "Energiya", 1965. 383 p. illus., biblio. 10,000 copies printed

TOPIC TAGS: automatic control design, automatic control equipment, data processing

PURPOSE AND COVERAGE: The book, written by staff members of the Institute of Automation and Electrometry of the Siberian Department of the Academy of Sciences SSSR, deals with electric automatic control systems, their structure, and their principal elements and characteristics. The emphasis is on the relation between production quality control and automatic inspection of the manufactured products, and emphasizes statistical methods, automatization of various measurements, and the handling of the information and data generated by the automatic control devices. Different systems, components, and individual control and measurement equipment are also described. Chapter 1 was written by K. B. Karandeyev, B. V. Karpyuk, A. N. Kasperovich, V. I. Rabinovich, P. YE. Tverdokhleb, and M. P. TSapenko, Ch. 3 by V. I. Rabinovich and M. P. TSapenko, Ch. 4 by B. S. Sinitsyn, Chs. 5 and 6 mainly by B. V. Karpyuk, Chs. 7 and 8 by A. N. Kasperovich, Ch. 9 by B. M. Pushnoy, Chs. 11 and 12 mainly by P. E. Tverdokhleb, and the appendix by B. V. Karpyuk. Authors thank the scientific workers

UDC: 621.317

Card 1/3

ACC NR: AM6004772

V. M. YEfimov and G. G. Matushkin who wrote the main material of Chs. 2 and 10 respectively; and also to the scientific staff members M. A. Rozov, G. A. SHtamberger, G. YE. YEremenchuk, YU. I. Baklanov, and others for supplying some data and for a discussion of individual problems considered in the book. They also thank L. YE. Pinchuk for participating in the preparation of the manuscript.

TABLE OF CONTENTS [abridged]:

Card 2/3

ACC NR: AM6004772

SUB CODE: 13/ SUBM DATE: 30Jun65/ ORIG REF: 198/ OTH REF: 066

Card 3/3

L 04524-67 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(l) IJP(c)
ACC NR: AP6022865 SOURCE CODE: UR/0145/66/000/002/0083/0088

AUTHOR: Rabinovich, V. I. (Engineer)

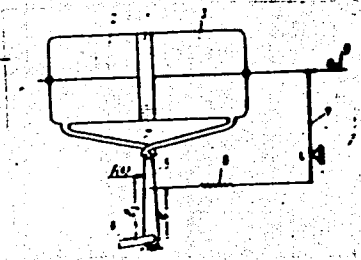
ORG: None

TITLE: Design of a pneumatic servomechanism with a jet tube

SOURCE: IVUZ. Mashinostroyeniye, no. 2, 1966, 83-88

TOPIC TAGS: pneumatic servomechanism, gas jet, Q factor, flow stability

ABSTRACT: The author studies the dynamics of a pneumatic servomechanism with a jet tube. A dynamic model of the mechanism is constructed on the basis of relationships for the thermodynamics of a body with variable mass. Analytic expressions are derived for the mechanical and power characteristics of the actuator and for the static characteristics of the servomechanism, and stability conditions are determined for neutral steady-state operation of the servomechanism. A schematic diagram of the device is shown in the accompanying figure. An algebraic equation is derived for the figure of merit on the stability boundary and a



1—piston, 2—1st working cavity, 3—2d working cavity, 4—tube line, 5—jet tube, 6—supply line, 7—feedback lever, 8—feedback spring, 9—load

UDC: 62-528+621.5.01

Card 1/2

L 04524-67

ACC NR: AP6022865

curve is given showing this boundary for specific numerical parameters of the servo-mechanism. The paper was presented for publication by Doctor of technical sciences Professor M. A. Mamontov. Orig. art. has: 3 figures, 18 formulas.

SUB CODE: 13/ SUBM DATE: 03APR65/ ORIG REF: 003

Card 2/2 egb

RABINOVICH, V.L. (Petropavlovsk, Severo-Kazakhstanskaya obl.)

Utilizing the similitude of arbitrary geometric figures. Mat. v shkole no.2:50-52 Mr-Ap '59. (MIRA 12:6)
(Dimensional analysis)

RABINOVICH, V.L. (Petropavlovsk-Kazakhstanskiy); KONSTANTINOV, N.N. (Moskva); VARPAKHOVSKIY, F.L. (Moskva); BESKINA, L.N. (Moskva); BEREZIN, F.A. (Moskva); GUTNIK, L.A. (Moskva)

Solutions of problems. Mat. pros. no.6:337-353 '61. (MIRA 15:3)
(Mathematics--Problems, exercises, etc.)

LOPSHITS, A.M., (Yaroslavl'); VIKSMAN, V.S. (Moskva); KARANIKOLOV, Khr. (Sofiya); BERKOLAYKO, S. (Belgorodskaya oblast'); BOKOV, Ye.A. (Krasnodarskiy kray); GABOVICH, Ya. (Tartu); SKOPETS, Z.A.(Yaroslavl'); RABINOVICH, V.L. (Petropavlovsk TSelinnogo kraya)

Problems. Mat. v shkole no.4:86 Jl-Ag '63. (MIRA 16:9)
(Mathematics--Problems, exercises, etc.)

RABINOVICH, V.M., inzh.

Optimum position of the resilient elements of the stator core suspension of a turbogenerator. Elektrotekhnika 36 no.12:56-57 D '65. (MIRA 19:1)

AUTHOR: Rabinovich, V.P., Engineer and Vasil'chenko G.S., Engineer.

TITLE: English and American overspeed installations for testing turbine discs. (Angliyskiye i Amerikanskiye razgonnye ustanovki dlya ispytaniy turbinnykh diskov.)

114-6-10/11

PERIODICAL: "Energomashinostroenie" (Power Generation Machinery Construction) 1957, Vol.3, No. 6, pp. 29 - 32 (U.S.S.R.)

ABSTRACT: The importance of overspeed testing of turbine discs at high temperatures is pointed out and the general principles of overspeed test installations are explained. Descriptions are then given of the following installations: Massachusetts Institute of Technology, Napiers (U.K.) Rolls Royce, General Electric (USA), Boeing, Westinghouse (USA) and Warren Brothers (USA). After describing the installations it is stated that experimental investigation of the strength of turbine discs is still in the initial stages of development. However, the investigations which have been made have been important for the development of steam and gas turbines. The expenditure involved on overspeed installations has been fully justified.

There is now a definite tendency to develop overspeed testing in the way of closer approximation to actual discs and actual operating conditions.

As experience with disc overspeed test installations

Card 1/2

English and American overspeed installations for testing turbine discs. (Cont.) 114-6-10/11

accumulates it appears possible to create installations for overspeed testing of fully forged and welded rotors of modern turbines, which has been necessary for a long time. To judge from recent information the firm of General Electric has already commenced construction of such an installation.

There are 5 figures, 7 literature references (English and American.)

AVAILABLE:
Card 2/2

RABINOVICH, V. P.

AUTHOR: Kobrin, M.M., Candidate of Technical Sciences and Rabinovich, V.P., Engineer. 96-7-3/25

TITLE: Testing to destruction of models of rotating turbine discs. (Razrusheniye modeley vrashchayushchikhsya turbinnykh diskov.)

PERIODICAL: "Teploenergetika" (Thermal Power), 1957, Vol.4, No.7, pp. 16 - 20 (U.S.S.R.)

ABSTRACT: The combination of properties required in the alloy steels used to make turbine discs is achieved by making the structure homogeneous by appropriate hardening and tempering procedures. However, the structure may sometimes be somewhat heterogeneous particularly in large discs. A possible form of heterogeneous structure consists of a comparatively hard sorbite base with inclusions of small quantities of a plastic ferrite component. Steel of this structure fails at the plastic component.

In order to evaluate the influence of such structural changes tests were made on rotating models to determine the strength of turbine discs. The strength was evaluated by overspeed tests carried out to

Card 1/6

Testing to destruction of models of rotating turbine discs. (Cont.) 96-7-3/25

destruction on model discs. The disc tested is illustrated in Fig. 1, it is of 250 mm diameter and 38 mm thickness at the boss. The dimensions are given. The discs were made from a single melt of steel 32 XH3M of the following chemical composition: 0.31% C, 0.27% Si, 0.52% Mn, 0.021% S, 0.025% P, 0.082% Cr, 3.13% Ni and 0.33% Mo. The heat treatment of the forgings is described. The heterogeneous structure was produced by incomplete hardening of discs which had previously been heat treated and fully machined. A special oven for heating the discs is described. The micro-structure of the metal of the discs in zones near to the surface of the hole in the boss is shown in Fig. 3. The heterogeneous structure consists of a comparatively hard basis of martensite sorbite and small sections of a plastic component - free ferrite located on the boundaries of the former austenitic grain in the form of a network or individual inclusions. The heat treated and machined discs were mounted on a shaft with an interference of 0.03 - 0.06 mm. Keys were also provided.

Card 2/6

Testing to destruction of models of rotating turbine discs. (Cont.) 96-7-3/25

The shaft and disc were erected in an overspeed test device illustrated in Fig. 4. The rotor is mounted on plain bearings outside the overspeed housing. One end of the rotor is connected to an air turbine which drives it at speeds up to 23 000 r.p.m. The achievement of such speeds is facilitated by the application of a vacuum of the order of 550 - 600 mm Hg to the overspeed test housing.

Overspeed tests on discs were made in two stages, first the rotor was run up to 5 000 - 8 000 r.p.m. to run in the bearings and this speed was maintained for 15 - 25 minutes. The supply of air to the turbine was then increased to the maximum and the rotor freely gathered speed until the disc broke. After fracture of a disc the pieces were carefully examined and measured to establish the nature of fracture. The limiting stress in the disc was calculated from the speed.

Card 3/6

Two methods were used to calculate the strength. One method assumed an elastic condition of the disc at fracture and the stress determined on the bore is a

Testing to destruction of models of rotating turbine discs. (Cont.) 96-7-3/25

maximum and is taken as the 'elastic' rupturing stress. In the second method the calculation was made according to the mean tangential stress on the supposition that at the moment of fracture there is complete equalisation of stress over the radius of the disc because of plastic deformation. The distributions of elastic and mean stresses over the radius of a disc at a speed of 18 000 r.p.m. are plotted in Fig. 5. The results of overspeed tests on discs with homogeneous and heterogeneous structure are tabulated together with information about the mechanical properties of the steel. It follows from comparison of the mechanical properties that the steel is of higher strength in the heterogenous condition. Considerable plasticity is retained despite the heterogeneous structure. Plastic failure with necking was observed with both homogeneous and heterogeneous structures. Overspeed tests in the plane stressed condition and stress concentrations caused by the presence of deep and narrow slots gave quite different behaviour for discs with homogeneous and

Card 4/6

Testing to destruction of models of rotating turbine discs. (Cont.) 96-7-3/25

heterogeneous structure. Discs of homogeneous structure undergo considerable plastic deformation before failure. A deformation diagram is given in Fig. 7, from which it is seen that the zone of plastic deformation occupies a considerable area and extends in a radial direction from the bottom of the slot. In discs with heterogeneous structure no traces of plastic deformation before failure were found. The type of fracture was quite different in the two cases as illustrated in Fig. 8. The different nature of fracture in the two cases is also evident from the difference in the appearance and condition of the fractured surfaces illustrated in Fig. 9. Practical brittle fracture of discs with heterogeneous structure instead of plastic fracture of discs with homogeneous structure was reflected in the results of the overspeed tests. The tabulated results show that discs Nos. 7 and 8, of heterogeneous structure, failed at lower speeds than all the rest although their tensile strength was 30 - 50% higher. It is concluded that the structural condition of the steel has an important influence on

Card 5/6

Testing to destruction of models of rotating turbine discs. (Cont.) 96-7-3/25

the strength of the discs. The presence of small inclusions of ferrite changes the nature of fracture from plastic to practically brittle. Overspeed tests showed a strength reduction of some 35% when a heterogeneous structure of the type of sorbite with small inclusions of a plastic component (ferrite) was present near to the zone of stress concentration. Comparison of calculated values of the ultimate strength of rotating discs with the ultimate strength of the material in tension showed that in the case of plastic failure the method of mean stresses permits of simple and reliable evaluation of the strength of rotating discs. The selection of procedure for calculating the strength of brittle rotating discs requires further experimental study. There are 9 figures, 1 table and 6 references, 4 of which are Slavic.

Card 6/6

ASSOCIATION: Central Scientific Research Institute of Heavy Engineering. (TsNIITMASh)

AVAILABLE:

Rabinovich, V.P.

VASIL'CHENKO, G.S., inzh.; RABINOVICH, V.P., inzh.

Overspeed investigations for austenite and composite turbine discs. Teploenergetika 4 no.12:35-42 D '57. (MLRA 10:11)

1. Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya.

(Gas turbines)

RABINOVICH, V.P.

32-9-24/43

AUTHOR: Kobrin, M.M., Rabinovich, V.P.

TITLE: Analysis of the Structure of Fractures of Rotating Disks (Analiz stroyeniya izlomov vrashchayushchikhsya diskov)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 9, pp.1109-1114 (USSR)

ABSTRACT: Here an example of the complicated structure of fractures in rotating disks is used as a basis for comparing simple and complicated fractures. For this purpose the simple fracture of the "pan" type, which is found in the case of smooth cylindrical samples of plastic material (which are destroyed in the case of the extension with the formation of a neck-like shape) is used. This fracture is characterized by the fact that on the "bottom of the pan" there is a coarser structure in the center, where the first damage was done by the working material passing through, whereas on the wall of the pan, which is inclined at an angle of 45°, there is a finer structure, which is produced by final destruction. A comparison between complicated and simple fractures showed that the former also represent a pan, only that it is modified in accordance with its shape of a disk. In the first seven series fractures, thanks to the homogeneous structure and the high degree of plasticity, were tough and pan-shaped, and there was no indication of any influence

Card 1/2

Analysis of the Structure of Fractures of Rotating Disks

exercised by the different initial concentration of stresses upon the amount of resistance against fracture. In the eighth series, which had a lower degree of plasticity because of greater strength and a heterogeneous structure, the fractures in the disks were brittle, and resistance against fracture was lower. There are 6 figures, 1 table, and 5 references, 4 of which are Slavic.

ASSOCIATION: Central Scientific Research Institute for Technology and Machine Construction (Tsentral'nyy nauchno-issledovatel'skiy institut tekhnologii i mashinostroyeniya)

AVAILABLE: Library of Congress

Card 2/2

KOBRIN, M.M., kand.tekhn.nauk; RABINOVICH, V.P., inzh.; SHISHOKINA, K.V., inzh.

Strength of rotating disks with residual stresses. Energomashinostroenie 4 no.4:12-16 Ap '58. (MIRA 11:7)
(Disks, Rotating)

RABINOVICH, V. P.

96-1-9/31

AUTHORS: Kobrin, M.M., Candidate of Technical Sciences and Rabinovich, V.P., Engineer.

TITLE: On the Loosening-speed of Discs with Keyways (Ob osvobozhdayushchem chisle oborotov diskov so shponochnymi pazami)

PERIODICAL: Teploenergetika, 1958, Vol.5, No.1, pp. 34 - 37 (USSR).

ABSTRACT: Calculation of the loosening-speed of discs, that is the speed at which the disc becomes separated from the shaft, is an essential stage in the design of built-up rotors. A formula is given for the loosening-speed based on the assumption that at this speed the radial stress on the bore is zero. The author has observed that, contrary to the general belief, during overspeed testing of turbines the loosening-speed of the discs may be much higher than the calculated value. Loosening-speed tests were made on models, as illustrated in Fig.1. One had two diametrically-opposite rectangular keyways; another had none. The discs were made of steel 32 XH3M, the mechanical properties of which are given, and were shrunk on to a shaft 50 mm dia., illustrated in Fig. 2, with an interference of 0.03 - 0.06 mm. They were press-fitted, the pressing diagrams being recorded. The mating surfaces of the disc and shaft were ground and lubricated with machine oil. Overspeed tests on the discs were made on the equipment described in a previous article in

Card1/4

On the Loosening-speed of Discs with Keyways. 96-1-9/31

Teploenergetika, 1957, No.7. Runs were made at different speeds and loosening was recognised by angular displacement of the disc on the shaft. The distribution of radial and tangential stresses when the model is rotated at 18 000 r.p.m. is illustrated in Fig.3. The measurements and the calculated loosening-speeds are tabulated, showing good agreement for discs without keyways but discrepancies for those with two diametrically-opposite keyways, which became loose only at a speed of 1.8 - 2.3 times the calculated value. This was at first attributed to distortion of the shaft, which was supposed to be swelling into the keyway as shown in Fig. 4A; but this supposition was disproved. It was, however, observed that when the disc was pressed onto the shaft it became trapezoidal in shape. Deformation observations were made on other discs with keyways, one of which was additionally fixed to the shaft by thin strips of low rigidity. These strips made it possible to drive the disc after it had been released but did not restrict expansion of the disc during rotation, so that observations of strain could be made at very high speeds. The tests were stopped after a speed of 21 500 r.p.m. at which plastic strain was found. The

Card2/4 strain was not symmetrical, the hole having become oval as

shown in Fig. 5. A gap formed between the discs and shaft in a direction perpendicular to the axis of the keyways, and the disc was touching the shaft near the keyway. It is, therefore, supposed that during overspeed tests the bore in a disc with two keyways ceases to be circular before the commencement of plastic strain. The removal of stress in the direction perpendicular to the keyways as the speed is increased is compensated by compression of the disc in line with the keyways.
The behaviour of discs with one keyway was studied on models subject to internal pressure, the strain being recorded by strain gauges. The tests showed that the strain was symmetrical until it became plastic. The different behaviour of discs with one and with two diametrically-opposed keyways was also confirmed by optical-polarisation tests. Photographs of optical test models showing stress distribution under internal pressure are given in Fig. 6. It is concluded that the actual loosening speed of discs with two diametrically-opposed keyways is greater than the calculated value because the bore deforms in a non-uniform manner. There are 1 table, 6 figures and 3 Slavic
Card3/4 references.

ASSOCIATION: TsNIITMASh.

On the Loosening-speed of Discs with Keyways. 96-1-9/31

AVAILABLE: Library of Congress

Card 4/4

RABINOVICH, V. P., Cand of Tech Sci -- (diss) "Investigation of the Durability of Turbine Disks Working Under Conditions of Creeping," Moscow, 1959, 16 pp (Central Sci Res Institute of Technology and Machine Building) (KL, 5-60, 127)

24(6) SOV/179-59-4-12/40

AUTHORS: Rabotnov, Yu. N., Rabinovich, V. P. (Moscow)

TITLE: On the Strength of Disks in Creep

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, 1959, Nr 4, pp 93-100 (USSR)

ABSTRACT: The results of the experiments for the strength test of disks in creeping are put forward. The problem of strength of a turbine wheel disk subjected to creep conditions consists of 2 tasks: 1) Determination of strains and deformation, and 2) determination of the conditions causing the destruction. The investigations described had primarily the purpose of checking the correct determination of stresses and deformation by experiment. Second, the conditions were checked under which the wheel disks are destroyed in creep. The usual calculation method is based on the assumption that the maximum creep strength of the material is equal to the maximum standard stress calculated according to the simplest aging theory (Ref 1). It is shown here that this calculation method ensures a satisfactory accuracy in the forecast of disk life, and, therefore may be used as a basis in the choice of admissible

Card 1/3

stress. It is shown that the properties of the material influence the strength of wheel disks. The investigations were carried out with 4 different materials used in turbine construction: perlite steel R-3, austenite steel EI-405 and EI-572, and nickel alloy EI-437b. The experiments were made at the overspeed tester of the TsNIITMASh (Central Scientific Research Institute of Technology and Machinery). The computations were carried out on the "Strela-3" electron computer by means of the program developed at the Institut im. Baranova (Institute imeni Baranov) by A. V. Amel'yanchik (Ref 4) for the elasticity- and plasticity calculation of disks. - The experimental results show that the strength of disk depends on the creep strength and on the ability of the material of redistributing the stresses. The latter ability is characterized by the value m. The diagram of the influence of a central boring on the disk strength is shown in figure 6. It is shown that this influence does not only depend on the share of the boring on the disk surface, but also on m. The experiments showed that in the case of good material properties, the stresses are also redistributed in flat disks if there is a creeping, i.e. that the principle of "equal strength" can be

ensured, to a certain extent, not by the shape of the disk but by the material. There are 6 figures, 1 table, and 8 references, 6 of which are Soviet.

SUBMITTED: March 20, 1959

RABINOVICH, V.P., inzh.

Strength of rotating disks subjected to great radial stresses.
Energomashinostroenie 5 no.3:37-41 Mr '59. (MIRA 12:3)
(Steam turbine disks)

RABIN[illegible], V.P.

report presented at the 1st All-Union Congress of Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb '60.

234. G. I. Pshenitsanov (Moscow): Large deflections of reinforced shallow cylindrical shells.

235. V. P. Rabinovich (Moscow), Yu. N. Rabotnov (Novosibirsk): Creep strength of turbine discs.

236. A. I. Rabotnikov (Odessa): Flow and consolidation of sands under the action of seepage forces.

237. Yu. N. Rabotnov (Novosibirsk): Creep.

238. R. M. Rappoport (Leningrad): Some problems in the theory of elasticity concerning the design of rock foundations.

239. R. M. Rappoport (Leningrad): Some difference equations of structural mechanics.

240. Kh. A. Rakhmatulin (Moscow): On the propagation of elastic-plastic waves in a half-space.

241. Kh. A. Rakhmatulin (Moscow): Propagation of disturbances in continuous media.

242. V. F. Raiuk (Sverdlovsk): Earth pressure on flexible retaining walls.

243. V. L. Rvatsev (Berdiansk): On the pressure of a punch on an elastic half-space.

244. P. A. Rebinder (Moscow): Types of high molecular and dispersion structures and their characteristic mechanical properties.

245. E. Reman (Budapest): On the influence of the maximum principal stress on the fatigue strength.

246. V. G. Rekats (Moscow): The application of the method of homogeneous solutions to some two-dimensional problems of the theory of elasticity.

247. A. R. Rzhanitsin (Moscow): Some three-dimensional problems of limit equilibrium in rigid, plastic solids.

248. M. I. Rozovskii (Dnepropetrovsk): On the application of the Volterra-Rabotnov principle to Arutiunian's creep theory of concrete.

249. M. I. Rozovskii (Dnepropetrovsk): Some problems of the integral operator theory of creep.

250. A. G. Rozovtsev (Leningrad): Design of wide-flange beams for bending and temperature effects.

251. B. D. Rupegin (Leningrad): The experimental study of the deformations of rock foundations.

252. O. M. Sapondzhian (Erevan): The determination of the deflections of a simply supported plate by the method of successive approximations.

253. V. S. Sarkisian (Erevan): Torsion of anisotropic prismatic bars of elongated cross section.

254. V. A. Sachkov (Kaliningrad): The impact of a double punch on a half plane.

255. L. V. Svirskii (Kazan): The use of similarity considerations for improving the convergence in the design of shells by successive approximations.

256. A. N. Semkov (Leningrad): Stability of cellular structures built on soft ground.

257. B. V. Semchenkov (Moscow): Bending of thin hinge-jointed slabs supported by an elastic layer of finite thickness.

258. B. R. Seth (Kharagpur): Finite bending of plates into cylindrical shells.

259. A. P. Siniteyn (Moscow): A beam on a two-layer half space beyond the elastic limit.

260. V. F. Sinitsin (Leningrad): Some problems of creep and consolidation of saturated soils.

261. M. G. Slobodianskii (Moscow): Determination of the natural frequencies of plates of constant and variable thickness.

262. B. E. Smitko (Leningrad): Dynamic problems of the design of retaining walls and soil foundations under impact loads.

263. B. E. Smitko (Leningrad): Solution of some dynamic problems of stringer structures by the method of initial parameters.

264. V. V. Sokolovskii (Moscow): On some problems of the theory of plasticity and soil mechanics.

265. N. A. Sokolovskii (Petrozavodsk): On a class of solutions of boundary value problems in plasticity.

266. E. S. Sorokin (Moscow): The effect of internal friction on the stresses in beams and plates under impulsive loading.

267. N. I. Spiridonova (Sverdlovsk): Stresses in ellipsoidal shells subjected to internal pressure.

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AUTHORS: Petrov, P.N. Engineer, Rabinovich, V.B., Candidate of Technical Sciences and Khinskiy, I.B., Candidate of Technical Sciences

TITLE: The influence of non-metallic inclusions on the strength of turbine discs

PERIODICAL: Energomashinostroyeniye, no. 11, 1961, 27-30

TEXT: Turbine discs and rotors are often scrapped because of minor defects discovered by ultrasonic or other methods. It is by no means certain that such rejection is always justified and the present work was undertaken to study the properties of annular plates cut from two forged steam turbine rotors which had been rejected because ultrasonic examination of the forging had revealed the presence of small internal defects. The two forgings examined were of steel grade 34XH3M1ФA (ЭИ415МФА) each with a principal diameter of 680 mm and weighing 4 tons. In one of these rotors radial ultrasonic examination revealed four zones of defects, the equivalent area of individual defects being up to 1.7 mm^2. All the defects were about 50 to 70 mm from the internal

Card 1/5

here, there were some tens of defects in each zone but most of them were of equivalent area 2-3 mm^2. The second forging had three zones with defects, the equivalent area of individual defects being 3-15 mm^2, all within 30 mm of the central bore. For test purposes plates were cut from both sound and faulty parts of the rotor, then stored for six months to remove hydrogen and restore plastic properties. All the plates were flat, 650 mm o.d., 90 mm i.d. and 30 mm thick with a thin and flexible extension on one side so that the plate was free to deform although firmly fixed to a shaft. The first tests were made on a sound plate which fractured at a speed of 22 050 r.p.m. It was evident from the fracture that plastic flow had occurred. All the other plates were then tested, giving speed-strain curves which were the same for sound and defective plates. In general, at speeds up to 1500 r.p.m. there was no strain, but at 18000 r.p.m. the strain was 0.2 mm on the o.d. and 0.5 mm on the i.d. The mean strain at 20 000 r.p.m. was 0.75 mm on the o.d. and 1.05 mm on the i.d. Two of the defective plates were tested to failure and fractured at 21 750 and 22 000 r.p.m., respectively, which is virtually the same as for the sound plate. Specimens for tensile and impact

Card 2/5

tests were cut from the failed plates and it was found that the samples from the central zone, where there had been considerable work-hardening, were the most severely modified. The accuracy of ultrasonic examination in revealing the defects was confirmed by direct observation. It is considered that the defects had little influence on the strength of the plates because of plastic flow of the metal Fig.6 plots strain in kg/mm^2 as a function of the square of the speed: curve 1 - maximum elastic stress; curve 2 - mean stress, curve 3 - actual maximum stress allowing for plasticity of material; curve 4 - elastic limit; curve 5 - ultimate strength The curves plotted in this graph were calculated from strain-speed data, using a computer. It is important to notice the difference between the maximum failure stress calculated without allowing for the plastic flow of the material from the actual maximum stresses. The higher the speed the nearer the actual maximum stress approaches the mean value The true stress concentration ratio is the ratio of the maximum to the mean stress and has a value of 2 at 12 000 r.p.m., of 1.46 at 15 000 r.p.m. of 1.05 at 20 000 r.p.m. and of 1.08 at 22 000 r.p.m As stress concentrations are almost entirely relieved before failure occurs

The influence of non-metallic ...

it is reasonable to suppose that similar relief of local stresses takes place near to small defects in the forgings. It is considered that the influence of inclusions is practically proportional to the ratio of their area to the area of sound metal at the section in question. Thus, the present plates, which have a section of 31 600 mm^2, will not be greatly affected by defects provided their total area at the dangerous section does not exceed about 400 mm^2. Obviously, however, this recommendation requires further checking. It is concluded that ultrasonic examination reliably revealed individual defects of the order of 3-5 mm^2 equivalent area. Defects of area up to 15 mm^2 had no influence on the strain or strength of the plates and presumably rotors with similar defects made of chrome-nickel steel with a yield point of 75 kg/mm^2 can safely be accepted in service. In steels that can undergo plastic flow, like that tested, the influence of defects is proportional to the ratio of their area to that of sound metal at the affected section. Further study is required to determine what defects are permissible. In particular, tests should be made on plates with defects of 10 mm^2 area and more and on discs of other materials or in other conditions, and so on. The following

Card 4/5

engineers participated in the work: T. A. Stepanova, Z.L.Zlatin, A.V. Shiryayeva and N. S. Mart'yanov. There are 6 figures and 7 references: 3 Soviet and 4 non-Soviet. The English-language references read as follows: Ref.1: E. L. Robinson: Trans.ASME, 1944, v.66, VII, No.5, pp.373-386; Ref.2: Fonda, L.B.: Trans.ASME, 1948, v.70, No.1, pp.1-12; Ref.3: Holmes, A.G., Jenkins, I.E. and Repko, A.I., NACA, Tech.Note, 1951, No.2397; Ref.4: Mega, S., Hagihara, S., Proc. of the Sixth Japan National Congress for Applied Mechanics", Tokyo, 1956-1957, pp.79-86.

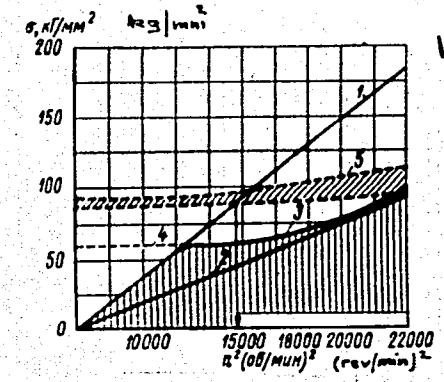

Fig.6

Card 5/5

ACC NR: AM6026442 Monograph UR/

Rabinovich, Vladimir Pavlovich

Strength of turbine disks (Prochnost' turbinnykh diskov) Moscow, Izd-vo "Mashinostroyeniye," 1966. 149 p. illus., biblio. 2200 copies printed.

TOPIC TAGS: turbine, steam turbine, gas turbine, turbine disk, disk material, disk system, disk failure, disk failure prevention

PURPOSE AND COVERAGE: This book is intended for engineers and scientific research personnel working in the field of steam and gas-turbine manufacturing. The book reviews theoretical principles of methods and experimental findings which serve for evaluating disk strength. The effect of properties of materials, systems of disks and operational conditions which affect disk strength are discussed and basic requirements which disk materials and systems have to satisfy are stressed. Special attention is paid to problems of preventing brittle and quasibrittle failures of disks and other machine parts.

TABLE OF CONTENTS [abridged]:

Card 1/2 UDC: 539.4.01:62-226

ACC NR: AM6026442

SUB CODE: 13, 11/ SUBM DATE: 23Mar66/ ORIG REF: 068/ OTH REF: 025

Card 2/2

RABINOVICH, V. R.

USSR/Geology
Geological Prospecting

Jun 1946

"Technical Re-equipment of Geological Prospecting Work," G. N. Borodin, V. R. Rabinovich, 12 pp

"Razvedka Nedr" No 3

Discussion and tables on the technical characteristics of the equipment for drilling geological prospecting wells.

PA 27T42

RABINOVICH, V.R., arkhitektor

Designing railroad line buildings having lightweight concrete suspension panels. Transp.stroi. 15 no.10:22-24 O '65.
(MIRA 18:12)

RABINOVICH, V.S.; SURKOV, V.D.; SURKOVA, A.A.

Giardiasis in children. Pediatriia 37 no.7:88 Jl '59.
(MIRA 12:10)

1. Iz detskogo otdeleniya bol'nitsy imeni N.A.Semashko g.Yaroslavlya.

(GIARDIASIS)

RABINOVICH, V.S.

Groups of unitary operators in Hilbert space. Trudy SAGU no.37:125-130 '54 [i.e. '53] (MLRA 10:3)
(Operators (Mathematics))
(Hilbert space)

RABINOVICH, V.S.

Connection of Mathieu's functions with the solutions of Laplace's equations in parabolic coordinates. Trudy Inst. mat. i mekh. AN Uz. SSR no.18:139-141 '56. (MLRA 10:4)
(Functions, Mathieu) (Harmonic functions)

RABINOVICH, V.S.

PHASE I BOOK EXPLOITATION SOV/4796

Akademiya nauk Uzbekskoy SSR, Tashkent. Institut matematiki i mekhaniki

Issledovaniya po matematicheskomu analizu i mekhanike v Uzbekistane (Research in Mathematical Analysis and Mechanics in Uzbekistan) Tashkent, Izd-vo AN Uzbekskoy SSR, 1960. 259 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Uzbekskoy SSR. Institut matematiki i mekhaniki imeni V.I. Romanovskogo.

Resp. Ed.: I.S. Arzhanykh, Corresponding Member, Academy of Sciences UzSSR; Ed.: I.G. Gaysinskaya; Tech. Ed.: Z.P. Gor'kovaya.

PURPOSE: This collection of articles is intended for mathematicians, mechanics, aspirants, and students taking advanced courses in divisions of physics and mathematics at universities and pedagogical schools of higher education.

COVERAGE: The collection contains 17 articles dealing with the results of investigations on the theory of integrating differential equations in mathematical physics and mechanics, the theory of numbers, and the problem of the best approximation of functions. Individual articles discuss elasticity, flow close to a rotating disk, transverse vibrations of beams, motion of an automobile after impact, thermal stress, etc. No personalities are mentioned. References accompany 14 articles.

1. RABINOVICH, V. Ya. and KARYAKIN, P. N.

2. USSR (600)

4. Boilers

7. Complete automatization of water heating boiler control. Energ.biul. no. 10, 1952

9. Monthly List of Russian Accessions, Library of Congress, March, 1953, Unclassified.

STETSENKO, A., inzh.; RABINOVICH, Ya., inzh.

Precast reinforced concrete hipped roof. Prom.stroi.i inzh.soor. 4 no.2:13-15 Mr-Ap '62. (MIRA 15:11)
(Roofing, Concrete) (Industrial buildings)

RABINOVICH, Ya., shturman dal'nego plavaniya, starshiy prepodavatel'

Increasing the accuracy of measuring the altitude of celestial bodies at sea. Mor. flot 23 no.1:22-24 Ja '63. (MIRA 16:4)

1. Kafedra sudovozhdeniya Murmanskogo vysshego morekhodnogo uchilishcha.

(Nautical astronomy)

MASLOV, V.I., inzh.; RABINOVICH, Ya.F., inzh.

Control of pulverized coal supply to individual burners.
Teploenergetika 10 no.12:88-89 D '63. (MIRA 17:8)

1. TSentroenergochermet.

RABINOVICH, Yakov Isaakovich; SLUTSKIY, M.B., redaktor; BARSUKOVA, Yu.V., tekhnicheskiy redaktor

[Handbook for skilled furniture workers] Spravochnik mastera mebel'nogo proizvodstva. Moskva, Vses. kooperativnoe izd-vo, 1956. 372 p. (MLRA 10:3)
(Furniture industry)

YUKHNIN, Ye.I., inzh.; RABINOVICH, Ya.I., inzh.

Building launches of glass-reinforced plastics. Sudostroenie 25 no.8:39-42 Ag '59. (MIRA 13:2)
(Boatbuilding) (Glass reinforced plastics)

RABINOVICH, Ya. I., inzh.

Protective coating of wooden boat hulls by glass-reinforced plastics. Sudostroenie 27 no.5:53-54 My '61. (MIRA 14:6)
(Boatbuilding)
(Plastics)

DERYAGIN, B.V.; RABINOVICH, Ya.I.

Experimental verification of the theory of thermophoresis of small aerosol particles. Koll. zhur. 26 no.5:649-650 S-O '64. (MIRA 17:10)

1. Institut fizicheskoy khimii AN SSSR, Moskva.

DERYAGIN, B.V., RABINOVICH, Ya.I.

Theory of thermophoresis of large aerosol particles checked by experiment. Dokl. AN SSSR 157 no.1:154-157 Jl '64. (MIRA 17:8)

1. Institut fizicheskoy khimii AN SSSR. 2. Chlen-korrespondent AN SSSR (for Deryagin).

DERYAGIN, B.V.; RABINOVICH, Ya.I.

Experimental test of the validity of Pascal's law in nonuniformly heated gases. Dokl. AN SSSR 162 no.1:50-53 My '65. (MIRA 18:5)

1. Institut fizicheskoy khimii AN SSSR. 2. Chlen-korrespondent AN SSSR.

RABINOVICH, Ya.M., inzh.; SAVEL'YEV, I.M., inzh.

Methods of improving hygienic conditions in the shoe industry. Kozh.-obuv. prom. no.5:9-12 My '59. (MIRA 12:6)
(Shoe industry) (Factories--Ventilation)